

## ON-OFF DIGITAL CONTROLLER FOR QUICK-COOLER/FREEZER MANAGEMENT

# EC 8-825

### GENERAL CHARACTERISTICS

- \* Frontal size: 72 x 144 mm (2.83 x 5.66 ").
- \* Power supply: 230 Vca.
- \* Six easy selectable cycles of functioning: quick-cooling, cold-storing, quick-cooling and cold-storing, quick-freezing, very cold-storing, quick-freezing and very cold-storing.
- \* Adapt to manage quick-cooling/freezing for temperature or time.
- \* Alarm buzzer included.
- \* One 3-digit 12.5 mm (0.49 ") high red LED display showing the temperature read by the needle/cabinet probe.
- \* One 3-digit 12.5 mm (0.49 ") high red LED display showing the remaining time at the end of a cycle/phase of quick-cooling/freezing.
- \* Adapt to manage electrical, hot gas and air defrost (automatic and manual).
- \* Three measure inputs (cabinet, evaporator and needle probe) for PTC probe.
- \* One configurable door-switch digital input.
- \* One configurable locking digital input.
- \* Four relay outputs of which one 16 (2) A @ 250 Vac relay for one 1½ HP compressor (NO) management and three 6 (2) A @ 250 Vac relays for evaporator fans (NO), defrost system (resistances or by-pass valve, change-over) management and cabinet light control (NO).



**EC 8-825** is an ON-OFF digital controller studied for quick-cooler/freezer management through the compressor, evaporator fans, defrost (for time-temperature) and cabinet light output control.

The instrument basically permits the control, according with the established parameters, automatic cycles of quick cooling/freezing of (pre-cooked or at environmental temperature) food temperature, using the compressor at its best, in order to preserve the product quality.

The controller has principally six different cycles of functioning configurable **according with the norms** and selectable through the keys located on the frontal panel:

**quick-cooling (for temperature or time)**, during which the instrument regulates the quick-cooling of food temperature, verifying that it happens within the maximum established time

**cold-storing**, during which the instrument works as a normal thermostat (with evaporator fans and defrost management) and regulating the cabinet temperature at the established value

**quick-cooling (for temperature or time) and cold-storing**, during which the instrument at fist executes the phase of quick-cooling and at its end automatically moves to the phase of cold-storing

**quick-freezing (for temperature or time)**, similar to the cycle of quick-cooling

**very cold-storing**, similar to the cycle of cold-storing

**quick-freezing (for temperature or time) and very cold-storing**, during which the instrument at first executes the phase of quick-freezing and at its end automatically moves to the phase of very cold-storing.

In order to assure a correct execution of a cycle/phase of quick-cooling/freezing for temperature of pre-cooked (hot) food temperature it is necessary that the needle probe is properly positioned inside the product: so, the instrument, at the beginning of the cycle, executes a test to verify the proper insertion of the needle probe; the overcoming of this test permits the execution of the cycle/phase, contrary some alarm signals gets activated.

The four outputs of which one 16 (2) A @ 250 Vac relay with NO contact (compressor output) and three 6 (2) A @ 250 Vca relays with NO contact (evaporator fans and cabinet light output) and change-over contact (defrost output) permit the direct management of loads, in small power refrigeration systems, without using auxiliary relays.

The device is provided of two temperature alarms (that can be disabled): the intervention of this kind of alarm activates the alarm buzzer with intermittent beep and the contemporary showing on the display of a proper temperature value bur alternated to an alarm code.

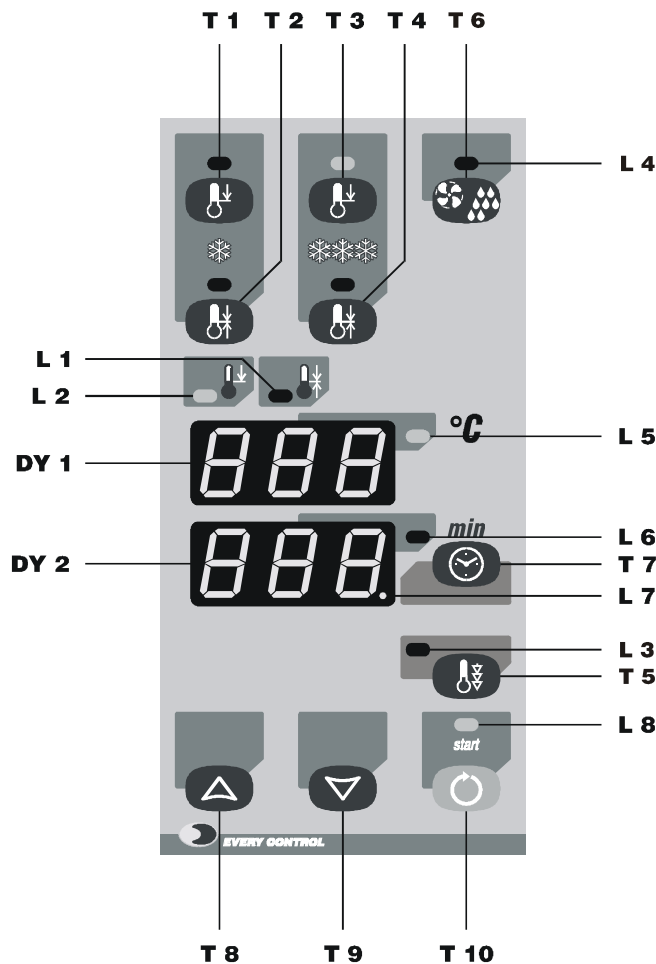
Others alarm conditions (not proper kind of probe, defective probe, wrong connection, temperature outside the limits permitted by the used probe, etc.), activate the alarm buzzer with intermittent and the contemporary showing on the display of univocal alarm codes that permit a sudden intervention against the causes of failure.

## FUNCTIONING:

Pressure on key **T 10** determines the start (status "ON", LED **L 8** lighted) or the stop (status "STAND-BY", LED **L 8** turned off) of the instrument: at any new restart the last programming will reappear; in case of lack of power-supply, when the voltage recover the last programming will reappear but an eventual count of a time will start from the beginning.

Pressure on key **T 7** during the status "STOP" selects the modality of quick-cooling/freezing of food temperature (for temperature, with LED **L 5** lighted and LED **L 6** turned off or for time, with LED **L 5** turned off and LED **L 6** lighted).

During the status "STOP" it is possible to select the desired cycle of functioning.



### **Cycle number 1a: Quick-cooling for temperature:**

Push the key **T 1** to select this cycle and the key **T 10** to start it: the LED **L 2** turning on.

If the parameter "d4" is set to 1 and if the conditions permit it (the temperature read by the evaporator probe must be below the set established with the parameter "d2"), the instrument automatically executes a defrost cycle to permit a best performance of refrigerating system: the indicators **DY 1** and **DY 2** respectively display the indications "dEF" and the time established with the parameter "c1", the LED **L 7** turning on (during this cycle the defrost will never be activated again).

In order to assure a correct execution of a cycle of quick-cooling it is necessary that the needle probe is properly positioned inside the product: so, the instrument (after pressure on key **T 10**), executes a test to verify the proper insertion of the needle probe (see the paragraph Needle probe properly positioned verify).

If the test has an happy success and if the conditions permit it (the eventual defrost cycle must be finished and the temperature read by the needle probe must be lower to the set established with the parameter "c8"), the instrument starts the cycle: the indicators **DY 1** and **DY 2** respectively display the temperature read by the needle probe and the decrease of the time established with the parameter "c1", the LED **L 7** flashes to indicate that a count of a time is on run, the outputs concerning get activated.

The kind of temperature regulation is ON-OFF: the temperature that regulates the compressor activity is the temperature read by the cabinet probe, the set can be established with the parameter "cb", the hysteresis can be established with the parameter "c0"; the evaporator fans output

is forced to the status ON.

When the temperature read by the needle probe reaches the set established with the parameter "c2" the cycle has a happy success, the buzzer is activated with intermittent beep for the time established with the parameter "c9", the indicators **DY 1** and **DY 2** respectively display the indications "End" flashing and "---", the LED **L 2** and **L 7** turning off, the compressor, evaporator fans and defrost outputs get deactivated: push the key **T 10** to set the instrument for a new cycle; pushing the key **T 7** the indicator **DY 2** displays the time in minutes occurred to reach the set established with the parameter "c2".

*When the time established with the parameter "c1" ends, if the temperature read by the needle probe is not lower the set established with the parameter "c2" the cycle does not end, the buzzer is activated till when it is stopped (pressure on key **T 9** permit to stop the buzzer), the indicators **DY 1** and **DY 2** respectively display the temperature read by the needle probe and the indication "0" flashing, the concerning outputs remain activated: pushing the key **T 7** the indicator **DY 2** displays the time in minutes passed from the start of the cycle.*

*When the temperature read by the needle probe reaches the set established with the parameter "c2" the cycle ends, the indicators **DY 1** and **DY 2** respectively and alternately display the indication "End" and "---", the LED **L 2** and **L 7** turning off, the compressor, evaporator fans and defrost outputs get deactivated: push the key **T 10** to set the instrument for a new cycle.*

### **Cycle number 1b: Quick-cooling for time:**

Push the keys **T 1** and **T 7** to select this cycle: the LED **L 6** turning on, the LED **L 5** turning off.

The indicator **DY 2** displays the length of the quick-cooling for time: to modify its value push the key **T 8** or **T 9**.

Push the key **T 10** to start the cycle: the LED **L 2** turning on.

If the parameter "d4" is set to 1 and if the conditions permit it (the temperature read by the evaporator probe must be below the set established with the parameter "d2"), the instrument automatically executes a defrost cycle to permit a best performance of refrigerating system: the indicators **DY 1** and **DY 2** respectively display the indications "dEF" and the during of the quick-cooling for time, the LED **L 7** turning on (during this cycle the defrost will never be activated again).

When the eventual defrost ends the instrument starts the cycle: the indicators **DY 1** and **DY 2** respectively display the temperature read by the cabinet probe and the decrease of the length of the quick-cooling for time, the LED **L 7** flashes to indicate that a count of a time is on run, the outputs concerning get activated; pushing the key **T 7** the indicator **DY 2** displays the time in minutes passed from the start of the cycle. The kind of temperature regulation is ON-OFF: the temperature that regulates the compressor activity is the temperature read by the cabinet probe, the set can be established with the parameter "cb", the hysteresis can be established with the parameter "c0"; the evaporator fans output is forced to the status on.

When the length of the quick-cooling for time ends the cycle has a happy success, the buzzer is activated with intermittent beep for the time established with the parameter "c9", the indicators **DY 1** and **DY 2** respectively display the indications "End" flashing and "0", the LED **L 2** and **L 7** turning off, the compressor, evaporator fans and defrost outputs get deactivated: push the key **T 10** to set the instrument for a new cycle.

### **Cycle number 2: Cold-storing:**

Push the key **T 2** to select this cycle and the key **T 10** to start it: the LED **L 1** turning on.

The indicators **DY 1** and **DY 2** respectively display the temperature read by the cabinet probe and the indication "---".

The instrument works as a normal thermostat with evaporator fans and defrost management.

The kind of temperature regulation is ON-OFF: the temperature that regulates the compressor activity is the temperature read by the cabinet probe, the set can be established with the parameter "c3", the hysteresis can be established with the parameter "c0"; the temperature that regulates the evaporator fans activity is the temperature read by the evaporator probe, the set can be established with the parameter "F1", the hysteresis can be established with the parameter "F2".

### **Cycle number 3a: Quick-cooling for temperature and cold-storing:**

Push the keys **T 1** and **T 2** to select this cycle and the key **T 10** to start it: the LED **L 2** turning on.

When the phase of quick-cooling ends (it is related in Cycle number 1a) the instrument moves to the phase of cold-storing (it is related in Cycle number 2).

### **Cycle number 3b: Quick-cooling for time and cold-storing:**

Push the keys **T 1**, **T 2** and **T 7** to select this cycle: the LED **L 6** turning on, the LED **L 5** turning off.

The indicator **DY 2** displays the length of the quick-cooling for time: to modify its value push the key **T 8** or **T 9**.

Push the key **T 10** to start the cycle: the LED **L 2** turning on.

When the phase of quick-cooling ends (it is related in Cycle number 1b) the instrument moves to the phase of cold-storing (it is related in Cycle number 2).

#### **Cycle number 4a: Quick-freezing for temperature:**

Push the key **T 3** to select this cycle and the key **T 10** to start it: the LED **L 2** turning on.

If the parameter "**d4**" is set to 1 and if the conditions permit it (the temperature read by the evaporator probe must be below the set established with the parameter "**d2**"), the instrument automatically executes a defrost cycle to permit a best performance of refrigerating system: the indicators **DY 1** and **DY 2** respectively display the indications "**dEF**" and the time established with the parameter "**c4**", the LED **L 7** turning on (during this cycle the defrost will never be activated again).

In order to assure a correct execution of a cycle of quick-freezing it is necessary that the needle probe is properly positioned inside the product: so, the instrument (after pressure on key **T 10**), executes a test to verify the proper insertion of the needle probe (see the paragraph Verify the proper insertion of the needle probe).

If the test has an happy success and if the conditions permit it (the eventual defrost cycle must be finished and the temperature read by the needle probe must be lower to the set established with the parameter "**c8**"), the instrument starts the cycle: the indicators **DY 1** and **DY 2** respectively display the temperature read by the needle probe and the decrease of the time established with the parameter "**c4**", the LED **L 7** flashes to indicate that a count of a time is on run, the outputs concerning get activated.

The kind of temperature regulation is ON-OFF: the temperature that regulates the compressor activity is the temperature read by the cabinet probe, the set can be established with the parameter "**cC**", the hysteresis can be established with the parameter "**c0**"; the evaporator fans output is forced to the status ON.

When the temperature read by the needle probe reaches the set established with the parameter "**c5**" the cycle has an happy success, the buzzer is activated with intermittent beep for the time established with the parameter "**c9**", the indicators **DY 1** and **DY 2** respectively display the indications "**End**" flashing and "---", the LED **L 2** and **L 7** turning off, the compressor, evaporator fans and defrost outputs get deactivated: push the key **T 10** to set the instrument for a new cycle; pushing the key **T 7** the indicator **DY 2** displays the time in minutes occurred to reach the set established with the parameter "**c5**".

*When the time established with the parameter "**c4**" ends, if the temperature read by the needle probe is not lower the set established with the parameter "**c5**" the cycle does not end, the buzzer is activated till when it is stopped (pressure on key **T 9** permit to stop the buzzer), the indicators **DY 1** and **DY 2** respectively display the temperature read by the needle probe and the indication "0" flashing, the concerning outputs remain activated: pushing the key **T 7** the indicator **DY 2** displays the time in minutes passed from the start of the cycle.*

*When the temperature read by the needle probe reaches the set established with the parameter "**c5**" the cycle ends, the indicators **DY 1** and **DY 2** respectively and alternately display the indication "**End**" and "---", the LED **L 2** and **L 7** turning off, the compressor, evaporator fans and defrost outputs get deactivated: push the key **T 10** to set the instrument for a new cycle.*

#### **Cycle number 4b: Quick-freezing for time:**

Push the keys **T 3** and **T 7** to select this cycle: the LED **L 6** turning on, the LED **L 5** turning off.

The indicator **DY 2** displays the length of the quick-freezing for time: to modify its value push the key **T 8** or **T 9**.

Push the key **T 10** to start the cycle: the LED **L 2** turning on.

If the parameter "**d4**" is set to 1 and if the conditions permit it (the temperature read by the evaporator probe must be below the set established with the parameter "**d2**"), the instrument automatically executes a defrost cycle to permit a best performance of refrigerating system: the indicators **DY 1** and **DY 2** respectively display the indications "**dEF**" and the during of the quick-freezing for time, the LED **L 7** turning on (during this cycle the defrost will never be activated again).

When the eventual defrost ends the instrument starts the cycle: the indicators **DY 1** and **DY 2** respectively display the temperature read by the cabinet probe and the decrease of the length of the quick-freezing for time, the LED **L 7** flashes to indicate that a count of a time is on run, the outputs concerning get activated; pushing the key **T 7** the indicator **DY 2** displays the time in minutes passed from the start of the cycle. The kind of temperature regulation is ON-OFF: the temperature that regulates the compressor activity is the temperature read by the cabinet probe, the set can be established with the parameter "**cC**", the hysteresis can be established with the parameter "**c0**"; the evaporator fans output is forced to the status on.

When the length of the quick-freezing for time ends the cycle has an happy success, the buzzer is activated with intermittent beep for the time established with the parameter "**c9**", the indicators **DY 1** and **DY 2** respectively display the indications "**End**" flashing and "0", the LED **L 2** and **L 7** turning off, the compressor, evaporator fans and defrost outputs get deactivated: push the key **T 10** to set the instrument for a new cycle.

### **Cycle number 5: Very cold-storing:**

Push the key **T 4** to select this cycle and the key **T 10** to start it: the LED **L 1** turning on.

The indicators **DY 1** and **DY 2** respectively display the temperature read by the cabinet probe and the indication "---".

The instrument works as a normal thermostat with evaporator fans and defrost management.

The kind of temperature regulation is ON-OFF: the temperature that regulates the compressor activity is the temperature read by the cabinet probe, the set can be established with the parameter "c6", the hysteresis can be established with the parameter "c0"; the temperature that regulates the evaporator fans activity is the temperature read by the evaporator probe, the set can be established with the parameter "F1", the hysteresis can be established with the parameter "F2".

### **Cycle number 6a: Quick-freezing for temperature and very cold-storing:**

Push the keys **T 3** and **T 4** to select this cycle and the key **T 10** to start it: the LED **L 2** turning on.

When the phase of quick-freezing ends (it is related in Cycle number 4a) the instrument moves to the phase of very cold-storing (it is related in Cycle number 5).

### **Cycle number 6b: Quick-freezing for time and very cold-storing:**

Push the keys **T 3**, **T 4** and **T 7** to select this cycle: the LED **L 6** turning on, the LED **L 5** turning off.

The indicator **DY 2** displays the length of the quick-freezing for time: to modify its value push the key **T 8** or **T 9**.

Push the key **T 10** to start the cycle: the LED **L 2** turning on.

When the phase of quick-freezing ends (it is related in Cycle number 4b) the instrument moves to the phase of very cold-storing (it is related in Cycle number 5).

### **Needle probe properly positioned verify:**

The instrument automatically makes a test to verify the proper insertion of the needle probe at any activation of a cycle/phase of quick cooling/freezing for temperature.

The test is organized on two levels (fast and differential): the happy success of the fast test excludes the differential test.

During the fast test the instrument verifies for five times if the value obtained with the subtraction of the temperature read by the cabinet probe at the temperature read by the needle probe is higher than the temperature setted with the parameter "c7" (the test is overcoming if at least 3 on 5 verifies has a happy success); the verifies is made every ten seconds, then the global length of the fast test is 50 seconds.

During the differential test the instrument verifies for eight times that the value obtained with the subtraction of the temperature read by the cabinet probe at the temperature read by the needle probe it is increase compared to the previous verify at least of 1 °C (the test is overcoming if at least 6 on 8 verifies has a happy success); the verifies is do any 1/8 of the time setted with the parameter "cE" (to exclude the differential test set the parameter "cE" with a value lower than 4 seconds, to exclude all the test set the parameter "c7" to 0).

*If the test have not a happy success, the cycle not ends, the buzzer is activated till when it is stopped (pressure on key **T 9** permit to stop the buzzer), the indicators **DY 1** and **DY 2** respectively display the indications "0.-" in alternate with the temperature read by the cabinet probe and the decrease of the time established with the parameter "c1" or "c4": push the key **T 6** to manually confirm the proper insertion of the needle probe.*

### **Hard-Soft quick-cooling:**

This temperature quick-cooling modality is only available during a cycle/phase of quick-cooling.

During the quick-cooling, this operation is divided in two parts: a Hard phase (in this phase the compressor work with a very low setpoint to permit to maximize the temperature quick-cooling speed) and a Soft phase (in this phase the compressor work with a setpoint higher than the previous setpoint).

To select the Hard-Soft quick-cooling push the key **T 5** when the instrument is in STAND-BY status: the LED **L 3** turning on.

If a cycle/phase of quick-cooling for temperature is selected, during the Hard phase the working-setpoint of the compressor can be established with the parameter "cF" (the Hard-phase automatically ends when the temperature read by the needle probe reaches the setpoint established with the parameter "cd"), during the Soft-phase the compressor works in the same way of the cycle 1a.

If a cycle/phase of quick-cooling for time is selected, during the Hard-phase the working-setpoint of the compressor can be established with the parameter "cF" (the Hard-phase automatically ends when the time established with the parameter "t1" is passed), during the Soft-phase the compressor works in the same way of the cycle 1b.

To unselect the Hard-Soft quick-cooling push the key **T 1**, **T 2**, **T 3** or **T 4** during the STAND-BY status: the LED **L 3** turning off.

### **Door-switch input (dedicated parameters u0, u1, u2):**

The instrument is provided of a door-switch input which activation does not end a cycle on run but determines the action established with the parameters "u0" and "u1" and it is indicated from the showing on the indicator **DY 1** of the indication "]-I" alternated to the indication that the indicator displayed when the door-switch input on alarm happened and (during the status "START") from the alarm buzzer activation with intermittent beep: a door-switch input on alarm does not permit the start of an any cycle of functioning.

### **Locking input (dedicated parameters u3, u4):**

The instrument is provided of a locking input which activation ends a cycle on run and determines the alarm buzzer activation with intermittent beep, the showing on the indicator **DY 1** of the indication "E4" alternated to the temperature read by the needle/cabinet probe when the locking input on alarm happened and (during the status "START") the compressor, evaporator fans and defrost outputs deactivation: a locking input on alarm does not permit the start of an any cycle of functioning.

The instrument unlocking happens when the locking input on alarm ends and (if this alarm happens during the status "START") through the stop and the restart of the instrument.

**The locking input on alarm has the priority on all alarms, except for the corrupted memory data alarm.**

### **Manual defrost:**

Push the key **T 6** during the status "STOP" to activate a request of defrost: the LED **L 4** flashes.

If the conditions permit it (the temperature read by the evaporator probe must be below the set established with the parameter "d2", apart from the value established with the parameter "d4"), pressure on the key **T 10** determines the activation of a defrost cycle: the indicators **DY 1** and **DY 2** respectively display the indication "dEF" and, according with the selected cycle, the time established with the parameter "c1" or the length of the quick-cooling for time or the indication "---", the LED **L 4** turning on.

Push the key **T 6** during a cycle/phase of cold-storing for four second at least to activate a request of a defrost cycle: if the conditions permit it (the temperature read by the evaporator probe must be below the set established with the parameter "d2") the instrument executes a defrost cycle; the indicators **DY 1** and **DY 2** respectively display the indication "dEF" and "---", the LED **L 4** turning on.

A defrost cycle on run can be immediately finished keeping pushed the key **T 6** for four second at least: the LED **L 4** turning off.

### **Manual ventilation:**

Push the key **T 6** during the status "STOP" for four second at least to force to the status on (LED **L 4** lighted) or off (LED **L 4** turned off) the evaporator fans output.

### **Borderline cases:**

- a) if the parameter "d1" has value 2, the parameters "d7", "F0", "F1", "F2", "F3", "F4", "F5" and "u1" do not interact on evaporator fans output status during a defrost cycle
- b) if the parameter "d1" has value 2, the door-switch input on alarm happened during a defrost cycle does not determine the alarm buzzer activation with intermittent beep
- c) if the parameter "u1" has value 1, the door-switch input on alarm happened during a *Manual ventilation* does not interact on the evaporator fans output
- d) in case of lack of power-supply happened during a defrost at the beginning of a cycle/phase of quick-cooling/freezing, when the voltage recover the defrost cycle will reappear only if the temperature read by the evaporator probe is below the set established with the parameter "d2" and if the parameter "d4" has value 1.

## SIGNALS

### Signals

### Indications

the LED <b>L 1</b> is lighted	a cycle/phase of cold-storing is on run
the LED <b>L 2</b> is lighted	a cycle/phase of quick-cooling/freezing is on run
the LED <b>L 3</b> is lighted	a Hard-Soft quick-cooling modality is selected
the LED <b>L 4</b> is lighted	a <i>Manual Ventilation</i> is on run
the LED <b>L 5</b> is lighted	the modality of quick-cooling/freezing for temperature was selected
the LED <b>L 6</b> is lighted	the modality of quick-cooling/freezing for time was selected
the LED <b>L 7</b> is lighted	the instrument is ready to execute the count of a time but the conditions do not permit it (a defrost cycle is on run or the temperature read by the needle probe is not lower the set established with the parameter " <b>c8</b> ")
the LED <b>L 8</b> is lighted	the instrument is on
the LED <b>L 7</b> flashes	a count of a time is on run
on the indicator <b>DY 1</b> appears the indication " <b>dEF</b> "	a defrost cycle is on run
on the indicator <b>DY 1</b> flashes the indication " <b>dEF</b> "	a delay count at the defrost cycle activation is on run (parameters " <b>C0</b> ", " <b>C1</b> ", " <b>C2</b> ", and " <b>d1</b> ")

## ALARMS (1/3)

### Alarms

### Causes

### Remedies

### Effects

on the indicator <b>DY 1</b> flashes the indication " <b>E0</b> " and the buzzer is activated with intermittent beep ( <b>cabinet probe failure</b> )	the kind of cabinet probe is not proper, the cabinet probe is defective, the connection instrument-cabinet probe is not proper, the temperature read by the cabinet probe is outside the limits permitted by the cabinet probe in use	check if the cabinet probe is a PTC probe, check the integrity of the cabinet probe, check the correctness of the connection instrument-cabinet probe, check if the temperature near the cabinet probe is inside the limits permitted by the cabinet probe in use	if the alarm happens during the status " <b>STOP</b> " it does not permit the start of a cycle of quick-cooling/freezing; if the alarm happens during a cycle of quick-cooling/freezing it immediately ends the cycle; if the alarm happens during a cycle of cold-storing the compressor output is activated with the modality established with the parameters " <b>C5</b> " and " <b>C6</b> " (or " <b>C7</b> ")
on the indicator <b>DY 1</b> flashes the indication " <b>E1</b> " alternated to a temperature value and the buzzer is activated with intermittent beep ( <b>evaporator probe failure</b> )	the same saw in the preceding case but referred to the evaporator probe	the same saw in the preceding case but referred to the evaporator probe	the defrost ends for maximum length (parameter " <b>d3</b> ")
on the indicator <b>DY 1</b> flashes the indication " <b>E2</b> " and the buzzer is activated with intermittent beep ( <b>corrupted memory data alarm</b> )	there is a failure of memorised configuration data	try to switch the power supply off and then switch it on: if the alarm persists also to the instrument re-start it is necessary to change the instrument	if the alarm happens during the status " <b>STOP</b> " it does not permit the start of any cycle of functioning; if the alarm happens during the status " <b>START</b> " it immediately ends the cycle, all the outputs are deactivated

## ALARMS (2/3)

<i>Alarms</i>	<i>Causes</i>	<i>Remedies</i>	<i>Effects</i>
on the indicator <b>DY 1</b> flashes the indication "E3" alternated to a temperature value and the buzzer is activated with intermittent beep ( <b>needle probe failure</b> )	the same saw for the cabinet probe failure but referred to the evaporator probe	the same saw for the cabinet probe failure but referred to the evaporator probe	if the alarm happens during the status "STOP" it does not permit the start of a cycle of quick-cooling/freezing for temperature
on the indicator <b>DY 1</b> flashes the indication "E4" alternated to a temperature value and the buzzer is activated with intermittent beep ( <b>locking input on alarm</b> )	the high-pressure input is on	deactivate the high-pressure input and, if the alarm happens during the status "START" push the key <b>T 10</b> to set the instrument for a new cycle	if the alarm happens during the status "STOP" it does not permit the start of any cycle of functioning; if the alarm happens during the status "START" it immediately ends the cycle, the compressor output is deactivated
on the indicator <b>DY 1</b> flashes the indication "e-." and the buzzer is activated with intermittent beep ( <b>needle probe test failure</b> )	the test to verify the proper position of the needle probe is failed (parameters "c7" and "CE")	push the key <b>T 10</b> to set the instrument for a new cycle	the cycle/phase of quick cooling/freezing for temperature ends when the time established with the parameter "c1" or "c4" is passed
on the indicator <b>DY 1</b> flashes the indication "End" and the buzzer is activated with intermittent beep for some seconds ( <b>cycle of quick-cooling/freezing for temperature successfully</b> )	a cycle of quick-cooling/freezing for temperature has successfully finished	push the key <b>T 10</b> to set the instrument for a new cycle	the compressor, evaporator fans and defrost outputs are deactivated
on the indicator <b>DY 1</b> flashes the indication "End", on the indicator <b>DY 2</b> appears the indication "0" and the buzzer is activated with intermittent beep for some seconds ( <b>cycle of quick-cooling/freezing for time successfully</b> )	a cycle of quick-cooling/freezing for temperature has successfully finished	push the key <b>T 10</b> to set the instrument for a new cycle	the compressor, evaporator fans and defrost outputs are deactivated
on the indicator <b>DY 1</b> appears a temperature value, on the indicator <b>DY 2</b> flashes the indication "0" and the buzzer is activated with intermittent beep ( <b>cycle/phase of quick-cooling/freezing out of maximum length</b> )	the temperature read by the needle probe has not reached the set established with the parameter "c2" (or "c5") inside the maximum length established with the parameter "c1" (or "c4")	push the key <b>T 10</b> to set the instrument for a new cycle	the concerning outputs remain activated
on the indicator <b>DY 1</b> appears the indication "End", on the indicator <b>DY 2</b> flashes the indication "---" and the buzzer is activated with intermittent beep ( <b>cycle of quick-cooling/freezing failed and out of maximum length</b> )	the temperature read by the needle probe has reached the set established with the parameter "c2" (or "c5") out of the maximum length established with the parameter "c1" (or "c4")	push the key <b>T 10</b> to set the instrument for a new cycle	the compressor, evaporator fans and defrost outputs are deactivated



### ALARMS (3/3)

<i>Alarms</i>	<i>Causes</i>	<i>Remedies</i>	<i>Effects</i>
on the indicator <b>DY 1</b> appears a temperature value, on the indicator <b>DY 2</b> flashes the indication "---" and the buzzer is activated with intermittent beep ( <b>phase of quick-cooling/freezing failed and out of maximum length and phase of cold-storing on run</b> )	the temperature read by the needle probe has reached the set established with the parameter "c2" (or "c5") out of the maximum length established with the parameter "c1" (or "c4") and the instrument moved to the phase of cold-storing	push the key <b>T 10</b> to set the instrument for a new cycle	the concerning outputs remain activated
on the indicator <b>DY 1</b> flashes the indication "]-[" alternated to a temperature value ( <b>door-switch input on alarm</b> )	the door-switch input is on	deactivate the door-switch input	the action established with the parameter "u0"
on the indicator <b>DY 1</b> flashes the indication "]-[" alternated to a temperature value and the buzzer is activated with intermittent beep ( <b>door-switch input on alarm</b> )	the door-switch input is on	deactivate the door-switch input	the action established with the parameters "u0" and "u1"
on the indicator <b>DY 1</b> flashes the indication "]-[" alternated to the indication "dEF" ( <b>door-switch input on alarm</b> )	the door-switch input is on during a defrost cycle managed at air (parameter "d1")	when the defrost cycle ends deactivate the door-switch input	the action established with the parameter "u0"
on the indicator <b>DY 1</b> flashes the indication "]-[" alternated to the indication "dEF" and the buzzer is activated with intermittent beep ( <b>door-switch input on alarm</b> )	the door-switch input is on during a defrost cycle managed at resistances or at hot gas (parameter "d1")	deactivate the door-switch input	the action established with the parameters "u0" and "u1"
on the indicator <b>DY 1</b> flashes the indication "AL" alternated to a temperature value and the buzzer is activated with intermittent beep ( <b>temperature alarm</b> )	the temperature read by the cabinet probe is outside the set established with the parameter "A1" (or "A3") or "A2" (or "A4")	check if the temperature read by the cabinet probe is re-entering the set established with the parameter "A1" (or "A3") or "A2" (or "A4")	inactive

## PROCEDURE OF CONFIGURATION PARAMETERS PROGRAMMING

The configuration parameters programming can be done during the status "STOP" only, if there is not a **corrupted memory data alarm**.

There are two Levels of configuration (Level 2 is protected by password):

### Level 1

Keep pushed	<b>T 8</b>	and	<b>T 9</b>	at the same time for 4 seconds at least: on the indicator <b>DY 1</b> appear the parameter " <b>PA</b> ".
Push	<b>T 8</b>	or	<b>T 9</b>	to select the parameter to modify at Level 1.
Keep pushed	<b>T 10</b>	and	<b>T 8</b> or <b>T 9</b>	to modify the selected parameter: after the modify release the key <b>T 10</b> as last.

### Level 2

From Level 1 push	<b>T 8</b>	or	<b>T 9</b>	to select the parameter " <b>PA</b> ".
Keep pushed	<b>T 10</b>	and	<b>T 8</b> or <b>T 9</b>	to set "-19": after the modify release the key <b>T 10</b> as last.
Keep pushed	<b>T 8</b>	and	<b>T 9</b>	at the same time for 4 seconds at least: on the indicator <b>DY 1</b> appear the first parameter of Level 2.
Push	<b>T 8</b>	or	<b>T 9</b>	to select the parameter to modify at Level 2.
Keep pushed	<b>T 10</b>	and	<b>T 8</b> or <b>T 9</b>	to modify the selected parameter: after the modify release the key <b>T 10</b> as last.

### How to leave the PROCEDURE

Keep pushed	<b>T 8</b>	and	<b>T 9</b>	at the same time for 4 seconds at least or wait 50 seconds without operate on the keyboard (time-out exit) or stop and restart the instrument after about 1 second from the last modify.
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## CONFIGURATION PARAMETERS (1/2)

NOTE	CODE	PARAMETER	DESCRIPTION	MIN.	MAX.	U.M.	STAND.
(1)	PA	password		-55	99	---	---
	/	<b>MEASURE INPUTS</b>					
(1)	/1	calibration (ref. to the cabinet probe)		-10	+10	°C	0
	c	<b>QUICK-COOLING/FREEZING AND COLD-STORING ON-OFF REGULATOR</b>					
(1)	c0	hysteresis (differential, ref. to the cabinet probe)		+1	+15	°C	+2
(1)	c1	maximum length of the quick-cooling for temperature		1	400	min.	90
(1)	c2	quick-cooling for temperature cut off set (ref. to the needle probe)		-55	+99	°C	+10
(1)	c3	cold-storing set (ref. to the cabinet probe)		-55	+99	°C	+3
(1)	c4	maximum length of the quick-freezing for temperature		1	400	min.	270
(1)	c5	quick-freezing for temperature cut off set (ref. to the needle probe)		-55	+99	°C	-18
(1)	c6	very cold-storing set (ref. to the cabinet probe)		-55	+99	°C	-25
	c7	threshold for needle probe properly positioned fast-test		0	+99	°C	+30
(1)	c8	quick-cooling/freezing for temperature enabling set (ref. to the needle probe)		-55	+99	°C	+65
	c9	alarm buzzer activation length when a quick-cooling/freezing ends		0	99	sec.	3
(1)(2)	cA	needle probe reading		---	---	°C	---
(1)	cb	quick-cooling working set (ref. to the cabinet probe)		-55	+99	°C	-10
(1)	cC	quick-freezing working set (ref. to the cabinet probe)		-55	+99	°C	-55
(1)	cd	Hard-phase cut off set (ref. to the needle probe)		-55	+99	°C	-15
	cE	during of the needle probe properly positioned differential-test		1	99	sec.	255
(1)	cF	Hard-phase working set (ref. to the cabinet probe)		-55	+99	°C	+15
	t	<b>HARD-PHASE DURING A QUICK-COOLING FOR TIME</b>					
	C0	Hard-phase during		1	400	min.	60
	C	<b>COMPRESSOR OUTPUT PROTECTIONS</b>					
	C0	disabling time at the output activation from the instrument start		0	99	min.	0
	C1	disabling time at the output activation from the preceding activation		0	99	min.	0
	C2	disabling time at the output activation from the preceding deactivation		0	99	min.	0
	C5	cycle time for the output activation in case of cabinet probe failure		0	99	min.	10
	C6	output activation length during the cold-storing in case of cabinet probe failure		0	99	min.	3
	C7	output activation length during the very cold-storing in case of cabinet probe failure		0	99	min.	8
	d	<b>DEFROST REGULATOR</b>					
(3)	d0	defrost interval		0	99	hours/min.	8
(4)	d1	kind of defrost		0	2	---	1
	d2	defrost cut off set (ref. to the evaporator probe)		-55	+99	°C	+2
	d3	maximum defrost length		1	99	min./sec.	30
	d5	first defrost intervall from the begin of the cold-storing phase		0	99	min.	0
	d4	defrost at the beginning of the quick-cooling/freezing 0=NO; 1=YES		0	1	---	0
	d7	dripping length		0	99	min./sec.	2
(5)	d9	forced defrost (delays override)		0	1	---	0
(1)(2)	dA	evaporator probe reading		---	---	°C	---
(6)	db	times base for the parameters d0, d3, d7 and F5		0	1	---	0
	F	<b>EVAPORATOR FANS REGULATOR</b>					
(7)	F0	output activity		0	1	---	0
	F1	output deactivation set (ref. to the evaporator probe)		-55	+99	°C	-1
	F2	hysteresis (differential, ref. to the evaporator probe)		+1	+15	°C	+1
	F3	output deactivated if the compressor is deactivated 0=NO; 1=YES		0	1	---	1
	F4	output deactivated during the defrost 0=NO; 1=YES		0	1	---	1
	F5	disabling time at the output activation from the end of the dripping		0	99	min./sec.	3
	u	<b>DIGITAL INPUTS</b>					
(8)	u0	door-switch activate cabinet light output 0=NO; 1=YES		0	1	---	1

## CONFIGURATION PARAMETERS (2/2)

NOTE	CODE	PARAMETER	DESCRIPTION	MIN.	MAX.	U.M.	STAND.
(8)	u1	door-switch deactivate evaporator fans output	0=NO; 1=YES	0	1	---	1
(8)	u2	door-switch input polarity	0=NO; 1=NC	0	1	---	0
(8)	u3	locking input polarity	0=NO; 1=NC	0	1	---	0
	u4	disabling time of the locking input on alarm		0	999	sec.	5
<b>A TEMPERATURE ALARM REGULATOR</b>							
	A0	hysteresis (differential, ref. to the cabinet probe)		+1	+15	°C	+2
(9)	A1	lower temperature alarm set relative to the cold-storing set (ref. to the cabinet probe)		-99	0	°C	0
(9)	A2	upper temperature alarm set relative to the cold-storing set (ref. to the cabinet probe)		0	+99	°C	0
(9)	A3	lower temperature alarm set relative to the very cold-storing set (ref. to the cabinet probe)		-99	0	°C	0
(9)	A4	upper temperature alarm set relative to the very cold-storing set (ref. to the cabinet probe)		0	+99	°C	0
	A5	disabling time of the alarm temperature from the beginning of the cold-storing		0	255	min.	30
	A6	disabling time of the alarm temperature		0	255	min.	0
<b>L RESERVED</b>							
	L1	reserved		---	---	---	---
	L2	reserved		---	---	---	---
	L3	reserved		---	---	---	---
	L4	reserved		---	---	---	---

## QUICK-COOLING/FREEZING FOR TIME

NOTE	CODE	PARAMETER	DESCRIPTION	MIN.	MAX.	U.M.	STAND.
			quick-cooling/freezing for time length	0	999	min.	90

## NOTES

- (1) = configuration parameters present on Level 1.
- (2) = reading parameter (it can not be changed).
- (3) = it establishes the time between the start of an automatic or manual defrost and the start of the following automatic one and, during a cycle/phase of cold-storing, the time between the start of the cycle/phase of cold-storing and the start of the first automatic defrost; if the parameter has value 0 the automatic defrost will never be activated, excepting the parameter d4.
- (4) = it establishes the kind of defrost that the instrument must manage, as indicated:  
 0=resistances (during the defrost compressor output deactivated and defrost output activated),  
 1=hot gas (during the defrost compressor and defrost outputs activated),  
 2=air (during the defrost evaporator fans and defrost outputs activated).
- (5) = it establishes if to subjugate the compressor output to the disabling time established with the parameters C0, C1 and C2 or to clear this times when a defrost is requested, as indicated:  
 0=the disabling time are observed,  
 1=the disabling time are cleared.
- (6) = it establishes the measure unit for the parameters d0, d3, d7 and F5, as indicated:  
 0=the measure unit for the parameter d0 is hours, the measure unit for the parameters d3, d7 and F5 is minutes,  
 1=the measure unit for the parameter d0 is minutes, the measure unit for the parameters d3, d7 and F5 is seconds.
- (7) = it establishes the output activity, as indicated:  
 0=the output activity depends from the temperature read by the evaporator probe and from the parameters F1 and F2, excepting the parameters d7, F3, F4 and F5,  
 1=the output is continuously activated, excepting the parameters d7, F3, F4 and F5.
- (8) = set to 0 this parameter if the digital inputs are not used.
- (9) = if the parameter has value 0 the temperature alarm is disabled.

## INSTALLATION

For a proper installation take note of the attached indications.

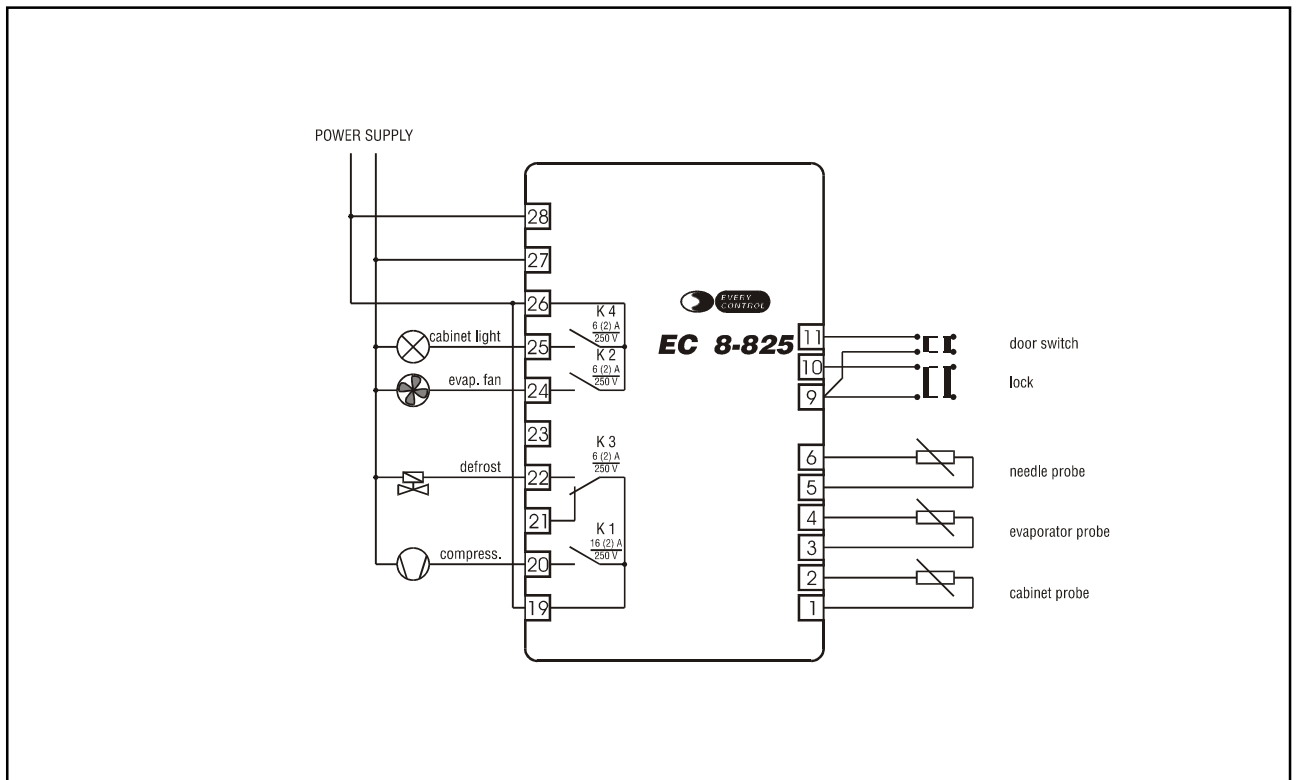
Be sure that the conditions of use (environment temperature, humidity, power supply voltage, etc ...) are inside the indicated limits.

Do not overload the relay outputs over the indicated limits.

It is necessary to give the outputs the suitable protection against the short circuits and overloads.

### Electrical connections

Example of typical application



## ELECTROMECHANICAL CHARACTERISTICS

<b>Case:</b>	plastic black (PPO), self-extinguishing ABS according with UL 94 V-0.
<b>Size:</b>	72 x 144 x 79 mm (2.83 x 5.66 x 3.11 ").
<b>Installation:</b>	panel mounting, panel cutout 67 x 138 mm (2.63 x 5.43 "), with equipped screw brackets.
<b>Frontal protection index:</b>	IP 54.
<b>Connections:</b>	extractable screw terminal blocks with pitch 5 mm (0.19 ", inputs) and pitch 7.5 mm (0.29 ", power supply and outputs) for cables up to 2.5 mm <sup>2</sup> .
<b>Environment temperature:</b>	from 0 to +60 °C (10 ... 90 % of relative humidity).
<b>Power supply:</b>	220 Vac, 50/60 Hz, 4 VA.
<b>Insulation class:</b>	II (only the models powered in ac).
<b>Alarm buzzer:</b>	included.
<b>Measure inputs:</b>	3 (cabinet, evaporator and needle probe) for PTC probe.
<b>Digital inputs:</b>	2 (5 V, 1 mA), door-switch and locking, configurable to interact with the outputs activity and for NO or NC contact.
<b>Working range:</b>	from -50 to +150 °C.
<b>Setting range:</b>	from -55 to +99 °C.
<b>Timer setting range:</b>	from 1 to 400 minutes for the quick-cooling/freezing for temperature and from 0 to 999 minutes for the quick-cooling/freezing for time.
<b>Resolution:</b>	1 °C.
<b>Display:</b>	two 3-digit display 12,5 mm (0.49 ") high red LED display with automatic sign, programming status indicators.
<b>Outputs:</b>	4 relays of which one 16 (2) @ 250 Vac relay for one 1½ HP @ 250 Vac compressor management (NO) and three 6 (2) A @ 250 Vac relays for evaporator fans (NO), defrost system (change-over) management and cabinet light control (NO).
<b>Kind of defrost managed:</b>	electrical, hot gas and air (automatic and manual).
<b>Defrost management:</b>	interval, cut off temperature and maximum length.